Determinants of Management Earnings Forecasts: The Case of Global Shipping IPOs

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European Financial Management, Forthcoming

ABSTRACT

Firms that go public on global stock markets are not obliged to disclose earnings forecasts in their prospectuses. We use this fact to examine the shipping industry, where most firms issue earnings forecasts during the IPO process, and thus provide unique, international-level evidence. We find overall pessimistic forecasts of ship owners, primarily because of the industry's uncertain and volatile environment. High ship owner participation after going public is associated with less accurate earnings forecasts. Our results further indicate that financial leverage, a listing in an emerging stock market, and global market conditions are other main factors responsible for inaccurate earnings forecasts.

JEL classification: D82, G14, G32, M41

Keywords: Earnings management, voluntary disclosure environment, forecast accuracy, IPOs

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1. Introduction

Management earnings forecasts represent one of the most important sources of information about listed companies and initial public offerings (IPOs) (Clarkson (1992), Bagisnki et al. (2002), Jog and McConomy (2003), Bagisnki et al. (2004), Hirst, Koonce, and Venkataraman, (2008), Godman et al (2014)). Beyer et al. (2010) report that approximately 55% of the accounting information available to U.S. investors comes from such forecasts.[2] Today, the popularity of voluntary management earnings forecasts in the U.S. has also become the dominant disclosure mechanism worldwide.[3] Huang et al. (2014) indicate that its mandate was one of the most significant corporate disclosure decisions in history, especially for small investors who have limited access to private information. Disclosure reduces the cost of capital for firms, and it can combat problems like asymmetric information and agency problems (Dye, (1985); Healy and Palepu, (2001)). Moreover, it enhances transparency, building firms' positive reputations and contributing to an expansion in their investor base.

In this study, we exploit the fact that a great part of global shipping firms voluntarily choose to issue IPO earnings forecasts. The policy of issuing earnings forecasts has drawn the attention of finance researchers because of its influence on investor decisions. Within transportation research, the interest in the various facets of financial reporting has been ongoing, with a focus on, e.g., alternative accounting policy choices (Tan et al., (2002)), intangible assets reporting (Lev, (2003)), and managerial discretion in assessing the reliability of financial reporting.

However, two factors received less attention in the analysis of financial reporting and disclosure of earnings forecasts in the transportation industry: 1) the quality of the signal that firms wish to transmit through earnings announcements to the financial markets and consequently to potential investors, and 2)

[2] In 2010 alone, approximately 4,500 annual earnings forecasts were issued by 950 U.S. firms, according to First Call's company-issued guidelines database.

[3] The majority of capital markets worldwide allow voluntary disclosure of management earnings forecasts, although, in the past, some countries mandated the practice (e.g., Canada, Greece, and Malaysia). Over the years, and largely because of significant forecasting errors, most local capital market commissions recommended that earnings forecasts become solely voluntary.

how the institutional setting serves to protect potential investors from being misled. The motivation for our study stems primarily from this gap in the literature.

The shipping industry, with its global, highly competitive, and extremely volatile nature, is distinct.[4] The majority of shipping companies that implemented an initial public offering (IPO) voluntarily announced their forecasted profits in their prospectus, thus contributing to the rise of a generally accepted regulatory system for corporate behavior. Nevertheless, many difficulties in forecasting earnings persist, because the industry is characterized by long-term investments and criticalities in accounting decisions (e.g., cost capitalization, depreciation and residual value, and leasing) (Godman et al., (2014)).

The importance of shipping lies in the fact that it constitutes an integral part of international trade. IPOs can provide shipping firms with critical resources for future expansion. They can secure the financial position of ship owners by providing them with their first substantial access to cash. The IPO prospectus provides potential investors with information that ought to help them making their investment decisions. It is common practice among shipping firms to make foreign listings due to the globalized nature of the industry, forcing managers to address the pronounced information asymmetries caused by the practical difficulties of information penetration among international investors.

One of the mechanisms that enables companies to reduce these information asymmetries is the disclosure of earnings forecasts in their prospectuses (Jaggi et al. (2006)). To develop a better understanding of the relationship between management earnings forecasts and their informational context in a globalized environment, a comprehensive analysis of the forecast characteristics is necessary. For example, do maritime IPOs report biased forecast earnings? Or, do they overstate or understate the information contained in their economic variables? In this article, we are particularly interested in U.S.-

[4] The definition of shipping we use refers to all listed companies in the shipping sector on major world exchanges, and it includes all corporations that own and/or operate ships, regardless of what subsector they belong to. Our study does not capture technical specifications or cargo, thus, we do not distinguish among different segments of the shipping industry. In general, the maritime industry is comprised of companies whose activities supply innovative services and products related to the traditional maritime sector. In general, the shipping industry includes all enterprises engaged in the business of designing, manufacturing, constructing, operating, acquiring, supplying, repairing and/or maintaining vessels, or components thereof, such as managing and/or operating shipping lines, customs brokerage services, shipyards, dry docks, marine railways, marine repair shops, shipping and freight forwarding services, and similar enterprises.

listed maritime IPOs. However, we also aim to determine whether there are any major differences compared to our international sample.

We compute earnings forecast errors and find pessimistic forecasts for the large majority of shipping IPOs. From our sample, we then identify the U.S.-listed companies, and observe that NYSE-listed IPOs tend to announce pessimistic earnings in their prospectuses, while Nasdaq-listed IPOs provide relatively more optimistic forecasts. Companies that disclose earnings forecasts prior to an IPO left less money on the table when measured by the degree of underpricing. Overall, contrary to the existing U.S. literature, our findings indicate that ship owners and their management tend to provide pessimistic earnings forecasts, that is, actual earnings exceeded forecasted profits. We attribute this finding primarily to the sector's highly volatile environment.

We then proceed by studying the factors that determine the quality of forecast earnings and assemble our main hypothesis. The factors that affect forecasted earnings quality come from three sources: 1) firm-specific idiosyncratic factors such as financial leverage, size, concentrated ownership, and age, 2) market-related factors such as the state of the shipping and stock markets, and 3) institutional factors such as Generally Accepted Accounting Principles (GAAP) and the mandatory application of International Financial Reporting Standards (IFRS). We develop a general-to-specific (GETS) model, based on Hendry et al. (2013), and within it, use Lewbel's (1997) methodology. Through model evaluation and reduction we end up with a well-specified model that allows us to extend the existing literature on earnings forecasts.

We also examine robustness for the location of the listing (domestic versus foreign) and the legal system (common versus civil law). Shipping IPOs experience higher forecast errors when they choose to list abroad rather than in their home country. Among foreign listings, there exists an overly high forecast inaccuracy for young, small, and highly financially leveraged shipping companies. To address legal system effects, we test for differences between civil and common law. We find that lower underpriced shipping IPOs tend to be associated with higher earnings forecast errors in a civil law environment, while in a common law environment it is the higher underpriced IPOs that fail to provide accurate forecasts. Final-

ly, the change in the financial reporting mechanism from local GAAP to IFRS has contributed to more accurate management earnings forecasts.

This paper makes several contributions to the existing literature. First, it analyses earnings forecast accuracy in a cross-country setting by concentrating on a highly volatile sector. The maritime industry, with its global character, offers a unique case because of the difficulties potential investors face in interpreting earnings forecasts announced by foreign listings. The uncertainty surrounding these companies makes the value of this information of great importance, even more so because over 90% of international trade is classified as sea trade (European Commission, 2010) and thus the maritime industry plays a crucial role in the global economy.

Second, uur findings are of particular interest because they shed light on the trends of U.S.-listed shipping companies with respect to disclosure in general and earnings forecasts in particular.[5] Third, we develop our arguments in the context of founders and/or ship owners who lead IPOs, that is, we examine IPOs where the original founders retained their equity stakes and board positions. The environment of these companies differs from that of the Berle and Means' (1932) model of agency conflicts in public companies, where ownership is widely dispersed. The founders of shipping IPO firms are typically the largest shareholders and retain majority control even after the IPO (Wasserman, (2003)).

Fourth, we offer new insights into the factors that influence earnings forecasts for shipping IPOs. For example, we find that a high financial leverage of shipping IPOs is associated with higher absolute forecast errors. In contrast, the age of the IPO firm and "hot" market conditions tend to be associated with lower absolute forecast errors.

Our study is related to the work on earnings forecasts of IPO firms of Lee et al. (1993) and Li and McConomy (2004) for Canada; Cormier and Martinez (2006) for France; Gounopoulos, Kraft, and Skinner (2016) for Greece; Jaggi (1997), Cheng and Firth (2000) and Chen, Firth, and Krishnan (2001)

[5] An earlier study by Baginski, Hassell, and Kimbrough (2002) on U.S.-listed companies indicates that companies are reluctant to provide earnings forecasts in prospectuses because of the potential for lawsuits under SEC Rule 10b-5. U.S. Congress enacted the Private Securities Litigation Reform Act of 1995 to encourage firms to disclose forward-looking information by reducing legal exposure. Nevertheless, during the IPO process, management still appears to be more hesitant of providing earnings forecasts.

for Hong Kong; Jelic, Saadouni, and Briston (2001) for Malaysia; Firth and Smith (1992) for New Zealand; Firth et al. (1995) for Singapore and the U.K. We extend Keasey and McGuinness's (1991) work, who examine the relationship between management earnings forecasting and IPO outcomes, by examining a comprehensive sample of international maritime IPOs.

The remainder of this paper is organized as follows. Section 2 reviews the related literature. Section 3 develops our testable hypotheses. Section 4 describes the data and methodology. Section 5 shows our empirical results. Section 6 provides a discussion of our findings. Section 7 presents some additional robustness tests, and section 8 concludes.

2. Literature Review

2.1 Theoretical framework

The role of management in disclosing earnings forecasts during prospectus preparation has received a fair amount of attention in the literature. The relation between voluntary disclosure and information quality was modeled in the work of Verrecchia (1983) and Dye (1985). They explore the choice to voluntarily disclose information through formal analytical modelling. In essence, Verrecchia (1983) shows that, due to the existence of proprietary costs associated with information disclosure, traders are unable to interpret non-disclosure unambiguously as bad news. As such, there exists a threshold level of disclosure that increases in proprietary cost.

Similarly, Dye (1985) suggests that, in the case of non-disclosure, investors may be uncertain about the nature of the information a manager possesses. He finds that signalling theory plays a role as long as there are information asymmetries between managers and investors and information is proprietary. Therefore, one can view the models of Verrecchia (1983) and Dye (1985) as restrictive cases of disclosure choice, but the application of their work to disclosure decisions remains valid (Guidry and Patten, 2012).

Lang and Lundholm (1993) conclude that "in the face of adverse selection [...] firms whose performance exceeds a certain threshold will disclose, while those below the threshold will not." Clarkson et

al. (2008) posit that firms with better performance will wish to signal that success via disclosure, while lesser-performing companies will remain silent in the hopes of being judged average instead of poorer-performing. Hopwood (2009) argues that, even when disclosure occurs, companies may be using it to reduce any questions they face. In particular they can retain an air of openness from reporting, while actually giving little other information away.

We further note that IFRS adoption has improved the information environment for the firms in our sample. Based on disclosure theory, an increase in mandatory disclosure should be accompanied by an increase in the incentives to voluntarily disclose (Dye (1990); Guidry and Patten (2012)).

2.2 Management earnings forecasts in IPOs

Disclosure of management earnings forecasts is largely voluntary. Such forecasts are key mechanisms by which managers not only establish or alter market earnings expectations, but also develop their reputations for transparent and accurate reporting (Hirst, Koonce, and Venkataraman (2008). Since it is such a key component of investors' decisions, the accuracy of disclosed earnings forecasts has received significant attention in the literature. Evidence of the accuracy of management earnings reveals absolute forecast errors (*AFE*s) ranging from as low as 10.4% for Singapore (Firth, (1998)), to as high as 1,138% reported by Lee et al. (1993) for Australia.

Gounopoulos, Kraft, and Skinner (2016) examine 305 Greek IPOs and provide a direct comparison between those obligated to provide earnings forecasts in their prospectuses with those allowed to voluntarily disclose their earnings forecasts. Their study reveals that managers' behavior changed and tended to become less pessimistic: underestimated earnings during the mandatory policy period (1993-2000) were converted to more optimistic outlooks during the voluntary policy period (2001-2009). The accuracy of earnings forecasts increased following the introduction of voluntary disclosure, but perhaps not to a level that would completely satisfy regulators and investors.

Prior studies have also focused on why managers choose to issue forecasts and what are the likely consequences (Ajinkya and Gift (1984); Skinner (1994); Verrecchia, (2001); Hirst, Koonce, and Venka-

taraman (2008)). Most extant literature addresses the antecedents and consequences of forecast disclosure, while there is little work on the aspect of managerial choice regarding forecast characteristics. To the extent that forecast characteristics have been examined, they have been treated primarily as exogenous variables (Baginski, Hassell, and Kimbrough (2004)). Given that managers exert much greater control over forecast characteristics than over forecast antecedents and consequences, it is surprising that the decisions they make about forecast characteristics are comparatively less well understood.[6]

This study investigates the value relevance of earnings forecast disclosure in the shipping industry. It is the first global sector study that uses the disclosure/non-disclosure dichotomy to distinguish forecasters from non-forecasters. We include several control variables to account for the fact that IPO values are influenced by factors other than earnings forecasts. For example, ex-ante uncertainty is associated with float value (Ritter, (1984); Rock, (1986); Beatty and Ritter, (1986). Our proxies for ex-ante uncertainty include leverage (Jelic et al., (1998); Morsfield and Tan, (2006)), and the length of the operational history, in essence, firm age (Jaggi, (1997); Jelic et al., 1998; Jog and McConomy, (2003)). Moreover, we suggest that signaling float quality through low proportions of retained ownership by ship owners strengthens IPO value (Hughes, (1986); Clarkson et al., (1992); Lee et al., (1993)). We also analyze the timing of going public by incorporating general market conditions (Ritter, (1984); Ljungqvist, Nanda, and Singh, (2006); Ivanov and Lewis, (2008).

2.3 Shipping IPOs

Globalization has had a huge impact on the maritime industry and helped drive the sector to unprecedented levels. Partially because of low-cost maritime transport, which helped make the shift of industrial production to emerging countries possible, ships are now involved in about 90% of global trade. Such a rapid pace of change required planning for how to raise capital and finance investments. Initially, most maritime companies secured bank loans, but they quickly became insufficient for the level of

[6] For example, relatively little is known about why managers decide to issue forecasts with external versus internal attributions, why they issue them in conjunction with other disclosures, and the nature of the content of these other disclosures (Baginski, Hassell, and Kimbrough, 2004).

growth. The next step was to raise equity through the stock markets. A record 81 companies issued IPOs over the 2003-2007 period, raising more than $6 billion. A unique aspect of shipping IPOs is that most do not list on the stock exchange of their country of incorporation, but instead on the leading global stock markets: NYSE, Nasdaq, and LSE. Greece is a particular example, where none of the 29 companies that went public listed on the local Athens stock exchange.

Shipping IPOs are distinct from those of ordinary industrial or service companies because the market value of a shipping company is often closely correlated with the underlying value of the physical asset (vessel). Due to the extensive amount of information on international vessel purchases and sales markets, shipping IPOs tend to exhibit lower information asymmetry, which deepens investors' risk appetites. Another unique characteristic of the sector is that ship owners, as a signaling device, typically retain large holdings in their companies.

2.4 International Setting of IPOs

The international setting of IPOs was explored earlier by Chowdhry and Sherman (1996), Dewenter and Malatesta (1997), Torstila (2003), Boulton, Smart, and Zutter (2011), Thomadakis, Gounopoulos, and Nounis (2012), Lin, Pukthuanthong, and Walker (2013), Shi, Pukthuanthong, and Walker (2013), Cattaneo, Meoli, and Vismara (2015), and Thomadakis et al. (2016). A study directly related to ours is Boulton, Smart, and Zutter (2011), who examine earnings quality and international IPO underpricing. They find that IPOs are underpriced less in countries where public firms produce higher quality earnings information. It appears that the impact of low earnings quality on underpricing is partially offset by the use of a top-tier underwriter. Moreover, Shi, Pukthuanthong, and Walker (2013) examine whether and how disclosure regulation works in international IPO markets. They find a significant negative correlation between IPO underpricing and disclosure regulation, indicating that more extensive disclosure requirements reduce information asymmetries in IPO markets.

2.5 Legal framework to publish earnings forecasts in IPO prospectuses

The legal environment of a prospectus, in which management earnings forecasting takes place, varies by disclosure status (mandatory versus voluntary), country law status (civil versus common), and accounting standards (local GAAP versus IFRS). Baginski, Hassell, and Kimbrough (2002) focus on management earnings forecast disclosures in the U.S. and Canada, two otherwise similar business environments that feature different legal regimes.[7] They document that Canadian securities laws and judicial interpretations create a far less litigious environment than in the U.S. Therefore, compared to the U.S., Canada exhibits a much greater frequency of management earnings forecast disclosure.

Skinner (1994), along with Kasznik and Lev (1995), document that legal liability increases U.S. firms' incentives to disclose management earnings forecasts when earnings news is bad. Moreover, U.S. managers are more likely to issue forecasts during interim periods in which earnings decrease. Canadian managers do not exhibit that tendency. Instead, Canadian managers issue more forecasts when earnings are increasing, and their forecasts include annual rather than interim earnings. More generally, managers seem more likely to issue forecasts, both good and bad, in less litigious environments.

Huang et al. (2014) argue that capital market regulators must assess whether mandating management earnings forecasts will improve the information environment or be counterproductive. They examine the efficacy of forecast regulation in the emerging market of China, which allows voluntary forecasts in some circumstances but mandates management earnings forecasts in others, such as anticipated losses, outsize profits, and large changes in earnings from the previous year. Their results suggest that the Chinese mandate substantially increases the quantity of information available to investors, particularly by state-owned enterprises (SOEs). Mandatory forecasts tend to be less timely and less precise, suggesting they may be of lower quality than voluntary forecasts. Nonetheless, investors react to mandatory forecasts as if they are useful.

Jaggi et al. (2006) explore earnings forecast disclosure regulations in the Taiwanese market. They observe optimistic forecasts that are driven mainly by weak investor protection rights under the Taiwan-

[7] Among other important determinants of the value relevance of accounting data, the U.S. and Canada share a market-oriented financial system, private sector standard setting, low influence of tax rules on financial accounting measurements, and higher spending on external auditing (Ali and Hwang, 2000).

ese legal system. A similar observation applies to the legal systems of other countries in the Asian Pacific Basin region (La Porta et al. (1998); Fan and Wong (2002)). Under such a framework, managers are enticed to maximize their IPO proceeds by publishing optimistic forecasts in IPO prospectuses to send positive signals about a firm's future performance. Mak's (1996) study on New Zealand, an environment with low legal risk, shows that the greater the information asymmetry and/or the specific risk, the more earnings forecasts are disclosed in IPO prospectuses.

2.6 Accounting standards for earnings forecasts on various stock exchanges

Many shipping companies have become increasingly dissatisfied with local GAAP and its voluminous rules for dealing with accounting issues. As a result, IFRS is now widely accepted. It has helped open the doors of the global marketplace, potentially improving liquidity and access to capital by offering transparency in the form of better disclosure to investors.

Many shipping IPOs that have gone public on European stock exchanges transitioned to IFRS immediately after their adoption in 2005. Foreign companies that chose to go public on U.S. stock exchanges were required to follow early adoption of U.S. GAAP for fiscal years ending on or after December 15, 2009, with mandatory transition after December 2014. As a result, the majority of the companies in our sample have gone public with U.S. GAAP.

There are many key differences between U.S. GAAP and IFRS, including their fundamental premises. At the highest level, U.S. GAAP is more of a rules-based system, while IFRS is more principles-based. Also, under U.S. GAAP, voluminous guidance attempts to address nearly every conceivable accounting problem that could arise. In contrast, IFRS contains a short volume of principles-based standards, which consequently require more judgment. Beyond the issue of rules versus principles, IFRS also can pose particular technical accounting challenges to companies in the shipping industry.[8]

2.7 Foreign (international) listings in the U.S.

[8] The internet appendix discusses differences between U.S. GAAP and IFRS that are of particular interest to shipping companies.

Many ship owners choose to list their companies on a foreign (international) stock exchange rather than on the market of their home country of incorporation. Arguably, this decision is motivated by the industry's international customer base, broader investor base, better investor protection laws, superior access to capital to fulfill investment plans, reduced risk premiums, higher levels of information disclosure, increased liquidity, and greater visibility (Foerster and Karolyi (1999); Lins, Strickland, and Zenner (2005); Karolyi (2006)).

The choice of a domestic or foreign market for the listing venue has direct implications for management earnings forecasts. Many Greek maritime companies, as well as several other European ones, have opted to go public in the U.S. Rather than reporting mandatory IFRS since January 2005, they were required to prepare their accounts under U.S. GAAP. Only after November 2007 did they have the choice to report using either U.S. GAAP or IFRS.

Doidge, Karolyi, and Stulz (2004) (2010) (2013) show that a U.S. listing reduces the extent to which controlling shareholders can engage in expropriation, thus increasing a firm's ability to take advantage of growth opportunities. They also find that companies that list in the U.S. are associated with higher valuation premiums compared to other firms in their home countries. Bruner, Chaplinsky, and Ramchand (2004) show that foreign firms that issue IPOs in the U.S. experience approximately the same underpricing as U.S. domestic IPOs. They argue that any risks of foreign IPOs arising from, e.g., asymmetric information or country risk are offset by U.S. domestic IPO characteristics. Moreover, there is no significant difference in underpricing between emerging and developed market IPOs in the U.S. In contrast, Bell, Moore, and Al-Shammari (2008) find that firms located in countries with higher levels of economic freedom are less underpriced than IPOs of firms from countries that enjoy lower levels of economic freedom.

Previous studies also examine the motivation and the economic benefits of a U.S. listing. The market segmentation hypothesis is the most oft-cited motive. Miller (1999) tests this hypothesis and finds that a foreign listing on a U.S. stock exchange by a non-U.S. firm is associated with a positive impact on firm value. He argues that a foreign listing allows investors to avoid foreign border barriers to

investment that can arise from regulatory restrictions, such as the misalignment between IFRS and U.S. GAAP in our study. Also preventing investors from investing in these markets is lack of knowledge about a market (Merton (1987). Removing barriers and integrating markets allows for more efficient diversification.

Non-U.S. firms are often controlled by founders and major shareholders, and this is particularly true in the shipping industry. From the controlling shareholders' perspective, there may be costs and benefits of a foreign listing. Most importantly, foreign listings provide external financing for investment activities, but they may also limit the ability to extract private benefits.

3. Development of Testable Hypothesis

We propose that the factors affecting forecasted earnings quality have three sources: 1) a firm-specific source that includes idiosyncratic factors, 2) a market-related source, and 3) an institutional source. To develop our hypotheses, we next discuss each of these factors.

3.1 Idiosyncratic factors

The importance of idiosyncratic factors for the quality of forecasted earnings was highlighted by many authors, including Jelic, Saadouni, and Briston (1998), Chen, Firth, and Krishnan (2001), Jog and McConomy (2003), and Morsfield and Tan (2006). Most importantly, given the cyclicality of freight revenues and vessel prices, the debt capacity of shipping firms and the related costs of financial distress are of primary concern for financial managers in the maritime industry. Increasing financial leverage can make the residual position of shareholders more risky and the cash flow to equity more volatile. As a result, increasing financial leverage will likely decrease the accuracy of earnings forecasts and increase forecast errors. Supporting this notion, Jelic, Saadouni, and Briston (1998) report that financial leverage is negatively correlated with average forecast errors. Morsfield and Tan (2006) argue that highly leveraged companies have an incentive to manipulate earnings upward to avoid covenant defaults. However, they also face stronger monitoring from debtholders. Therefore, the higher a firm's leverage, the greater will be the likelihood that manager will choose accounting procedures that shift reported earnings from fu-

ture periods to the current period.

The shipping industry is dominated by businesses with deep-rooted family ties. During the IPO process, the founders generally have two main concerns: to retain control of the company and to ensure the success of the IPO. Irrespective of the specific institutional setting, owners retain control in most publicly-listed shipping firms. Chen, Firth, and Krishnan (2001) and Jog and McConomy (2003) find a positive correlation between the number of inside shareholders post-IPO and the level of accuracy of the earnings forecasts. Blockholders have privileged access to company information, thus they can likely issue more accurate earnings forecasts. This notion suggests a positive association between the stake of the largest shareholder and forecast accuracy and a negative one between the stake of the largest shareholder and the forecast error.

Earlier findings by Chen, Firth, and Krishnan (2001) indicate that IPOs with large outside ownership after the issue exhibit lower forecast errors. Bruner, Chaplinsky, and Ramchand (2006) report levels of founder ownership after going public of 39%. Their findings support the tenets of agency theory that concentrated ownership improves IPO performance. Therefore, we expect that shipping companies with high founder participation after going public will choose to provide earnings forecasts in their prospectuses, and if management decides to release earnings forecasts, they will prove to be more accurate.

3.2 Market-related factors

Firms tend to time their IPOs when information asymmetry is low (Bessler, Drobetz, and Grueninger (2011)). During upward-trending periods, adverse selection costs are relatively low. Therefore, riskier firms with more volatile cash flows, which would otherwise not have access to public equity, may tap the IPO market during these periods (Lucas and McDonald, (1990) Baker and Wurgler, (2002)). Boehme and Colak (2012) document that for stocks issued during hot IPO market conditions the flow of information is lower.

The maritime industry uses the Baltic Dry Index (BDI) to assess whether the market is in an up-

ward- or downward-trending phase and to infer the level of volatility.[9] During normal market conditions, when the growth in traded volume is predictable, freight rates tend to be in a low to medium range and exhibit little volatility (e.g., during the pre-2003 market). The growth in demand, due to the emergence of China as a main importer starting in 2003, caused a boom in freight markets that continued until just before the financial crises.[10] One would expect that stability of freight rates, coupled with low volatility, enables financial managers to release more accurate earnings forecasts.

3.3 Institutional factors

Many countries with sizeable capital markets, such as Australia, EU members, Hong Kong, and South Africa, required publicly traded companies (with certain exceptions) to present consolidated financial statements in conformity with IFRS for each financial year beginning on or after January 1, 2005. Other countries, such as Japan, decided to adopt IFRS in the future, but allow companies to voluntarily report under its guidelines. While mandatory adoption of IFRS was widespread in 2005, there are still firms that follow other accounting standards. In some countries, such as the U.S., China, and Malaysia, firms were not allowed to use IFRS.

Prior research indicates that higher-quality reporting reduces the problem of adverse selection in securities markets (Healy et al. (1985); Welker (1995); Lambert, Leuz, and Verrecchia (2007)), reduces the cost of capital (Botosan, (1997); Hail and Leuz, (2006), and improves the efficiency of information intermediaries (Lang and Lundholm, (1996); Healy et al., (1999); Hope, (2003)). If IFRS are higher-quality and provide better information, then IFRS adoption should have the potential to generate these benefits. In fact, Barth et al. (2008) and Landsman, Maydew, and Thornock (2012) find that firms' reporting quality increases after voluntary IFRS adoption.

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[9] The BDI is a leading economic indicator that tracks the worldwide international shipping prices of various dry bulk cargoes, such as coal, iron ore, and grain.

[10] Sharp increases in freight rates accompanied the higher freight rate volatility (Drobetz, Richter, and Wambach, 2012). This trend is consistent with the theoretical shipping market supply and demand model, which predicts larger shocks in up markets and smaller shocks in down ones. In addition to this asymmetric size effect, this framework posits that positive shocks have a higher impact on conditional volatility than negative shocks of the same magnitude, based on the convexity of the supply curve.

We investigate the effects of mandatory IFRS adoption on managements' forecast accuracy in IPOs. Many studies (Byard et al. 2011); Tan, Wang, and Welker, (2011); Glaum et al., (2011); Horton et al., (2013), among others) reveal that forecast errors decrease for firms that mandatorily adopt IFRS. In contrast, we address the question whether IFRS adoption has led to an increase in earnings forecast accuracy even when the forecasts took place prior to the stock market listing. Put differently, we test whether the IRFS-related increase in forecast accuracy also holds in an IPO context. We expect that prior to IFRS implementation investors were less capable of anticipating deviations from forecasted earnings. We attribute this largely to the flexibility that managers may have had to distort accounting figures under the various local GAAP, without tight control by the local authorities.

We further analyze the impact of the institutional framework on management earnings forecasts. La Porta et al. (2000) indicate that common law countries provide the strongest protections to outside investors, to both shareholders and creditors. French civil law countries have the weakest protections, and German and Scandinavian civil laws fall in between. These differences should also be reflected in the accuracy of management earnings forecasts.

4. Data and Methodology

4.1 Data description

To test our hypothesis that idiosyncratic, market-based, and institutional factors affect management earnings forecast accuracy, our initial sample included 203 internationally listed maritime companies for the January 1987-December 2011 period. We excluded 14 firms because financial data was not available. For the remaining 189 firms, of which 68 are registered on U.S. stock exchanges, 78 decided not to announce earnings forecasts. The remaining 111 issued earnings forecasts. We mandated the availability of the following items as prerequisites for inclusion in our final sample: IPO prospectus, financial statements for the year prior to the offering, forecasts of profits before taxes, and stock prices for at least 12 months or 250 trading days post-IPO. The majority of information used in our study was extracted manually from prospectuses, annual reports, and financial statements. Such data included the earnings forecasts from the prospectus, the actual forecasts from annual reporting, the legal system of

incorporation, the country of listing's actual adoption of IFRS, and the price range of the offer price.

We used the Bloomberg database as our main source for downloading the IPO prospectuses and any missing annual reports. The standard stock prices for U.S. companies came from CRSP, and market indices for non-U.S. companies from Datastream. These databases left some gaps, so we also conducted manual data collection (i.e., for countries such as India, Malaysia, the Philippines, and Russia). We collected historical accounting information from published financial statements in Compustat at the end of fiscal year t-1. Because we are interested in underwriter reputation in an international context, we followed the updated version of Loughran and Ritter (2004), available on Jay Ritter's website, which ranks 1,154 underwriters by quality.

Because the window of opportunity for an IPO is related to market conditions, we construct a dummy variable for "hot" periods (Lowry, (2003); Derrien and Kecskes, (2007); Bancel and Mittoo, (2009). As a metric for hot periods, we use the number of IPOs performed during a given quarter ((Ritter *et al.* 2013)) and the return of the Baltic Dry Index (BDI) as well as the stock exchange of listing (see Appendix A).

Panel A of Table 1 provides the number of annual listings of the 189 IPOs in our sample, and classifies them into "provide forecast" or "no forecast" depending on whether the IPO prospectuses contained earnings forecasts. Moreover, Panels B-D in Table 1 report the summary statistics for three different subsamples: the 111 shipping IPO firms with earnings forecasts, the 78 shipping IPO firms without earnings forecasts, and the 49 U.S.-listed shipping IPO firms with earnings forecasts. As summarized in panel E (using a test for differences in means and medians), the companies that provided earnings forecasts were older (34.55 years versus 20.83 years) and larger (higher capitalization at the IPO date of USD 476 million versus 360 million) than those that did not. Moreover, these companies' prospectuses were signed by more reputable underwriters (0.56/1 versus 0.41/1)[11] and characterized by a higher percentage of ownership of the largest shareholder post-IPO (35.97% versus 28.29%). Finally, Panel F

[11] We use Jay Ritter's IPO underwriter reputation rankings over the 1980-2009 period (available at http://bear.warrington.ufl.edu/ritter/). A part of this database was also used in Loughran and Ritter (2004).

summarizes firm characteristics by country.

[*Please Insert Table 1 about here*]

4.2 Empirical methodology

The determinants of earnings forecast errors in a global industry are conceptually intriguing, but pose some methodological problems. In particular, we need to control for both sample selection and endogeneity in order to obtain unbiased and consistent estimates (Greene, 2006; Semykina and Wooldridge, 2010). Therefore, our model is developed in two stages: (1) a selection equation, and (2) an outcome equation. In stage 1, we specify selection through a probit model of the functional form: *Prob* (being selected in the sample) = *f* (determinants of the selection). To control for potential selection bias, the selection mechanism is modelled using the inverse Mills ratio.

The inverse Mills ratio shows how the variables included in the first stage are related to the sample selection (Heckman, (1979)). Technically, it is the ratio of the probability density function to the cumulative distribution function of a distribution. Its use is often motivated by the following property of the truncated normal distribution: if x is a random variable distributed normally, with mean μ and variance σ^2, then it holds:

$$E(x|x>a) = \mu + \sigma[\{\varphi((a-\mu)/\sigma)\}/\{1-\Phi((a-\mu)/\sigma)\}], \quad (1)$$

where a is a constant, φ denotes the standard normal density function, and Φ denotes the standard normal cumulative distribution function. The term in brackets on the right-hand side of equation (2) denotes the inverse Mills ratio.

In our case, studying earnings forecasts, a selection problem may occur in a truncated sample because earnings forecasts are only available, for example, for listed firms with higher average leverage and concentrated ownership. As a result, the sample may not be random, and the estimated impact of the determinants on forecasted earnings may be biased. In fact, the shipping firms in our global IPO sample are more homogeneous than the population, especially with regard to size. For example, because size

tends to be negatively correlated with corporate governance, as measured by the extent of concentrated ownership, the association between forecasted earnings (and their quality) and corporate governance may be underestimated. The inclusion of the inverse Mills ratio in the structural equation will help to derive unbiased estimates.

Using a probit model, the probability of being in the selected model is estimated in stage 1 as a function of variables explaining the selection. Next, we construct the inverse Mills ratio, which we include in the structural (outcome) equation in stage 2 (see equation (3) below). In particular, in stage 1 the selection equation is estimated for our 189 listed shipping companies:

$$Probit\ (Announcement_i) = f\ (AGE_i,\ SIZE_i,\ CONC_i,\ FLEV_i,\ EXC_i,\ H/C_i,\ MAIR_i,\ UND_i). \qquad (2)$$

Our selection model in equation (2) includes the age of the company when it was listed (*AGE*), firm size (logarithm of the total market capitalization at the IPO date, *SIZE*), ownership concentration (percentage ownership of the highest shareholder post-IPO, *CONC*), financial leverage (debt-to-equity ratio, *FLEV*), the stock exchange dummy variable (*EXC*), the general market condition dummy variable (*H/C*), raw initial return (*MAIR*)[12], and the underwriter dummy variable (*UND*). An important assumption is that the two variables *EXC* and *UND* will potentially influence selection, but not the outcome. Therefore, they are omitted from the structural equation in stage 2. All variables are described in detail in Appendix A.

Because the inverse Mills ratio is a non-linear function of the variables included in the first-stage probit model, call these X, the structural equation in stage 2 will be identified − because of this non-linearity − even if all variables of X are included. However, the non-linearity of the inverse Mills ratio arises from the assumption of normality in the probit model. It remains questionable, even if normality has been tested, if this assumption should be used as the sole source of identification. Therefore, to

[12] $MAIR_{i,t}$ denotes the market index-adjusted return of company *i*: $MAIR_{i,t} = |(P_{i,1} - P_{i,0})| / |P_{i,0}| - |(I_{i,1} - I_{i,0})| / |I_{i,0}|$, where $P_{i,1}$ denotes the closing price of company *i* at the end of the first trading day; $P_{i,0}$ is the offering price of company *i* provided in the prospectus; $I_{i,1}$ denotes the level of a broad index of the respective stock market at the end of the first trading day; and $I_{i,0}$ is the index level on the date the prospectus of company *i* was issued.

make identification unambiguous, we use variables that are responsible for the correct specification of the selection equation, but which will be omitted from the outcome equation Sartori (2003). In our case, we drop from the outcome equation two variables that we consider relevant for the correct specification of the selection equation. The first is *EXC*, the stock exchange dummy variable with value 1 if the listing occurs in a developed market (and 0 otherwise). Arguably, in such markets, to attract investors and enhance their reputation, shipping firms are more likely to voluntarily announce earnings forecasts. The second variable excluded from the outcome equation is *UND*, the underwriter dummy variable with value of 1 if the underwriter is reputable (and 0 otherwise). The more reputable an underwriter is, the more likely it is for shipping firms to announce earnings forecasts. In contrast, these two variables should play no role for the magnitude of the forecasted earnings errors. To verify this conjecture, we re-estimate the outcome equation, include both *EXC* and *UND*, and apply a Wald test to test their joint significance. In results not reported, we find that the null hypothesis of being jointly not different from zero cannot be rejected.

The outcome model in stage 2 addresses the problem of endogeneity caused by reverse causality between forecasted earnings and concentrated ownership. We use the GMM-method and estimate a system of two equations: (1) absolute forecast error (*AFE*) as a function of a number of determinant variables, where we also include the inverse Mills ratio; and (2) the endogenous variable *CONC*, the extent of ownership concentration, as a function of *AFE*, control variables, and instruments that account for reverse causality. More formally, we have: (1) dependent variable = *f* (determinant variables, inverse Mills ratio); and (2) endogenous variable = *g* (instruments, dependent variable, control variables). Given this conceptual setup, we estimate the following system of linear equations involving the functions *f* and *g*:

$$AFE_i = f\,(FLEV_i, AGE_i, SIZE_i, CONC_i, H/C_i, MAIR_i, IFRS_i, IMILLS_i) + u_{i,1} \quad (3a)$$

$$CONC_i = g\,(AFE_i, FLEV_i, AGE_i, SIZE_i, H/C_i, MAIR) + u_{i,2} \quad (3b)$$

where *IMILLS* denotes the inverse Mills ratio, and *IFRS* is the dummy variable for the adoption

of the International Financial Reporting Standards (*IFRS*). We estimate the system of equations in (3) because, based on a Hausman test, the dependent variable *CONC* is endogenous in the first equation and jointly determined with *AFE*.

We use two metrics of accuracy to measure the earnings forecast errors made by the management of shipping IPO companies. In the simplest setup, the forecast error reflects the difference between the actual and predicted earnings figures for the same period:

$$FE_{i,t} = (AP_{i,t} - FP_{i,t}) / |FP_{i,t}|, \quad (4)$$

where $FE_{i,t}$ denotes the forecast error; $FP_{i,t}$ denotes the forecasted profit before taxes over the next accounting period, as disclosed in the IPO prospectus; and $AP_{i,t}$ is the reported/realized profit before taxes that corresponds to the accounting period for which the forecasts were made. Earnings are before taxes and extraordinary items. A positive value for the mean forecast error in in equation (4) implies that IPO companies had a pessimistic bias (IPO underforecast), while a negative value indicates an optimistic bias (IPO overforecast).

Because we are interested in determining the accuracy of earnings forecasts, in our regression analyses we use the absolute forecast error, labelled *AFE*. The AFE measure is computed using the absolute value of the forecast error for each IPO, and indicates how close the forecasts were to actual (realized) profits in absolute terms:

$$AFE_{i,t} = |(AP_{i,t} - FP_{i,t})| / |FP_{i,t}|. \quad (5)$$

Although two-stage least-squares (2SLS) is an appropriate method of estimation, we use the GMM-method because it is more efficient than 2SLS when dealing with arbitrary heteroscedastic error terms, which may also be correlated (Wooldridge, (2001). Using the *J*-test and the *F*-statistic from the first stage regression allows us to test whether our choice is appropriate.

Lewbel (1997) provides an important theoretical advance of the instrumental variables (IV) methodology. Assume that we start with equation $Y = f(W, Z)$, where W are predetermined variables,

and Z are endogenous variables. Moreover, assume that $G = G(W)$ is any function of W. Lewbel (1997) proves that valid instruments for equation $Y = f(W, Z)$ are $g \times z$, $g \times y$, and $y \times z$, where lower-case letters denote deviations from the means. Under symmetry of the error terms, z^2 and y^2 are also valid instruments, which always satisfy at least the order conditions for identification.

In our empirical setup, we have g = [*SIZE*, *AGE*, *H/C*,], z = [*FLEV, MAIR*], and y = [*AFE, CONC*], where lower-case letters of the functions denote that all variables are deviations from the mean. Assume that X = vech[$g \otimes z$, $g \otimes y$, $y \otimes z$, $z \otimes z$, $y \otimes y$] is the extended set of instruments, which are stacked in a single vector.[13] Suppose there are K variables in the X vector; in our case, we have $K = 20$. Accordingly, the GMM orthogonality conditions are as follows:

$$n^{-1} \sum_{i=1}^{n} (AFE_i - f(FLEV_i, AGE_i, SIZE_i, CONC_i, H/C_i, MAIR_i, IFRS_i, IMILLS; \theta)) X_{ik} = 0 \quad (7a)$$

$$n^{-1} \sum_{i=1}^{n} (CONC_i - g(AFE_i, FLEVi, AGE_i, SIZE_i, H/C_i, MAIR_i; \theta)) X_{ik} = 0, \quad (7b)$$

where $i = 1,...,n$ (the number of sample firms); $k = 1,...,n$ (the number of instruments); θ is the parameter vector in the linear models f and g; and X_{ik} is the extended set of instruments. The *GMM* orthogonality conditions provide a total of $2K = 2 \times 20 = 40$ equations for the 16 parameters (including constant terms).

We start our estimation with X = [*FLEV, SIZE, AGE, H/C, MAIR, C*] as the initial set of instruments. However, because some of the variables (except *SIZE, AGE, H/C*, and *MAIR*) may be endogenous, we do not expect the corresponding estimators to perform well. We proceed with applying Lewbel's (1997) methodology and use variables in $X \otimes X$, that is, the squares and cross-products of the variables in X, as instruments. Table 2 shows the correlation matrix of the control variables and results from the first-stage (reduced form) regressions, where the two endogenous variables *AFE* and *CONC* are regressed on all instruments.

[*Please Insert Table 2 about here*]

[13] The operator only selects the different elements in the various cross-products.

Weak instruments are a crucial issue in GMM estimation. If instruments are weak, 2SLS and GMM can lead to biases even in large samples, and the distributions may be non-normal (Stock and Yogo, (2005)). Wooldridge (2001) demonstrates that, in certain instances, the problem of weak instruments can be extreme, implying that the (biased) OLS estimator should be preferred. As noted in Stock and Watson (2003), a simple guide for selecting an appropriate set of instruments is the *F*-statistic in the first-stage (reduced-form) regression. The null hypothesis is that all slope coefficients are zero, and an *F*-statistic greater than 10 is usually assumed to suggest that the set of instruments is valid. Furthermore, valid instruments should be correlated with the endogenous variables and produce a high *R*-square in the first-stage regression. As shown in panel C of Table 2, using the initial naïve set of instruments delivers poor results in our application. The initial set of instruments fails the *F*-test criterion, while the Lewbel (1997) approach produces both very high coefficients of determination and *F*-statistics well above 10. We expect that the extended set of instruments using Lewbel's (1997) methodology will deliver more reliable results.

5. Descriptive Statistics and Empirical Results

5.1 Descriptive statistics

Table 3 classifies shipping IPOs based on the country of domicile and their listing stock market. Given the maritime industry's substantial contributions to the Greek economy since ancient times, the country is the leader in issuing activity, with twenty-nine listed shipping IPOs. Among those, nineteen provided earnings forecasts, and fifteen signaled a pessimistic bias (i.e., actual earnings were higher than those announced in the IPO prospectuses). The U.S. and Norway follow, with twenty-six and twenty listings, respectively.

Regarding the market of listing, shipping companies seem to prefer the U.S. In fact, of our sample of 189 shipping IPOs, 68 were listed on the NYSE and the Nasdaq. Of those, 45 provided earnings

forecasts, despite being governed by the voluntary regime, and 28 announced a conservative forecast (i.e., actual earnings were higher than those announced in the IPO prospectuses). The second choice for shipping IPOs is the Oslo Stock Exchange, a robust peripheral market with a strong tradition in sea-borne trade.

[*Please insert Table 3 about here*]

A large number of shipping companies opt to list their stocks on foreign stock exchanges rather than on exchanges in their home markets. As Table 4 shows, this was the case for 65 companies from our sample (mostly choosing the U.S. market). A major reason behind these decisions is that shipping companies continually need large amounts of funds because of their ever-increasing investment volumes. Larger, more established, and liquid stock markets enable them to raise capital on more favorable terms. Another reason for this preference toward foreign stock exchanges is that the institutional environments of the markets in several countries are more closely linked to the characteristics and requirements of the maritime industry (e.g., with MLP structures in the U.S. or trust structures in Singapore).

[*Please insert Table 4 about here*]

Table 5 analyzes potential determinants of earnings forecast accuracy. Specifically, we report *FE* and *AFE* in relation to offering size, age, and the ownership of the largest shareholder post-IPO. Panel A categorizes IPO firms by offering size. Large U.S.-listed shipping IPOs exhibit a low bias (as indicated by the *FE* metric), which increases for non-U.S-listed IPO firms. We observe a similar pattern for the accuracy measure, the *AFE* metric, with very large offers exhibiting mean *AFE*s of 41.97% and 60.43% for the U.S. and non-U.S. shipping IPOs, respectively. The smallest U.S.-listed firms exhibit the highest mean *AFE*s of 78.01%. Overall, although forecast errors are generally high, those of U.S.-listed IPOs are lower. This observation supports the notion that mature markets compel managers to provide investors with more reliable information.

[*Please insert Table 5 about here*]

Panel B of Table 5 sorts IPO firms by age at the time of going public, computed as the year of the IPO minus the founding year. U.S.-listed shipping firms with a long pre-IPO operating history exhibit low mean *FE*s (0.69%), but high mean *AFE*s (102%). Against expectations, shipping companies with a long operating history seem unable to provide accurate earnings forecasts when going public. Finally, panel C of Table 5 indicates that there is no clear relation between forecast errors and our ownership variable in a univariate setting.

5.2 Empirical results

Table 6 shows the results from the selection model, estimating the probit model in equation (2). Marginal effects are calculated as follows:

$$M.E(x_i) = (\sum_i \alpha_i \bar{x}_i) * \alpha_i , \quad (8)$$

where α_i is the probit coefficient of the variable x_i times the variable mean, summing over all variables and multiplying by the specific probit coefficient. Firm age (*AGE*) is significant and positively related to the probability of forecasting earnings. A one percent change of a company's age changes the probability that earnings will be forecasted by 0.4%. The coefficient on size (*SIZE*), which is negative and significant, implies that larger firms have a lower probability of announcing earnings forecasts. A one percent increase in the size of a firm will reduce the probability of forecasting earnings by 18%, confirming earlier results by Clarkson (2000). A change of *EXC* from zero to one increases the probability of forecasting earnings by almost 90%, implying that firms listed on developed market exchanges have a distinctly higher probability to announce earnings forecasts. Moreover, a change of *H/C* from zero to one, indicating a hot market period, increases the probability that earnings will be forecasted by 35%. As in Gong (2009) a one percent increase in market-adjusted returns (*MAIR*) reduces the probability of forecasting earnings by 0.8%. Finally, underwriter reputation exhibits a strong and positive marginal effect on the probability to forecast earnings, confirming Vismara et al. (2015) and Gounopoulos et al.. In particular, a change of the variable *UND* from zero to one, indicating a high underwriter reputation, increases the probability of forecasting earnings by 43%.

[*Please insert Table 6 about here*]

Our main results are shown in Tables 7 and 8. In a first step, we control only for endogeneity in Table 7, and we use these results as our benchmark. Turning to the GMM-Lewbel regression results, we find that both financial leverage (*FLEV*) and size (*SIZE*) exhibit a positive and significant impact on the absolute forecast error (*AFE*), while age (*AGE*) has a significantly negative impact. Surprisingly, larger firms make more inaccurate forecasts. Concentrated ownership (*CONC*) is significant and positively correlated with the absolute forecast error.

[*Please insert Table 7 about here*]

In a second step, in Table 8 we report the results for our system of equations after controlling for both selection bias and endogeneity. Sample selection bias is important because the inverse Mills ratio is significant at the 10% level. Most importantly, however, we find that all variables of importance for the *AFE* as the dependent variable, as already indicated in Table 7, maintain their significance and their sign. The probability value of the *J*-statistic confirms instrument exogeneity. Technically, to derive unbiased and consistent coefficient estimates, the estimation methodology requires instrument variables. An appropriate instrument is a variable correlated with the regressor variables, but uncorrelated with the error term. In practice, good instrument variables are difficult to find, as documented in Bound, Jaeger, and Baker, (1995). Lewbel's (1997) GMM methodology addresses this issue. As shown in panel C of Table 2, based on the *R*-squared and the *F*-test criteria, Lewbel's (1997) choice of instrument variables dominates the initial (naïve) set of instruments, thus yielding improved statistical inferences in the context of a GMM methodology.

[*Please insert Table 8 about here*]

Another technical caveat is that several of the variables used in our analysis are assumed to influence both outcomes, and thus they are included as regressors in the probit and GMM stages of the mod-

el. Therefore, the interpretation of the marginal effects for these variables must be adjusted to correct for selectivity bias as follows (Sigelman and Zeng (1999)):

$$\frac{\partial E(Y|\, S^{*}>0, X)}{\partial X_k} = \beta_k - \gamma_k \rho \sigma_\varepsilon \delta(-w\gamma) \tag{9}$$

where Y is the dependent variable, S^* is a latent variable denoting selection, β_k and γ_k are the estimated coefficients for X_k in the outcome and selection equations, ρ is the correlation coefficient between the error terms of the selection and outcome equations, σ_ε is the root mean squared error of the outcome equation, and $\delta(-w\gamma)$ is a function of the inverse Mills ratio, obtained from the linear predictions $(-w\gamma)$ of the selection equation.

We observe that firm-level factors strongly impact the size of forecast errors. Specifically, the positive sign of the coefficient on financial leverage (*FLEV*) suggests that companies with an already high level of leverage before going public provide less accurate earnings forecasts in their IPO prospectuses. Increasing *FLEV* makes the residual position of shareholders riskier and the cash flow-to-equity ratio more volatile, thereby decreasing the accuracy of earnings forecast. The marginal effect estimate shows that a one percent increase in financial leverage will increase the average forecast error by 0.16%.

The coefficient on firm age (*AGE*) is negative and statistically significant. This finding confirms previous studies that report a positive relationship between forecast accuracy and age (Jaggi, (1997); Jelic, Saadouni, and Briston, (1998); Gounopoulos, Kraft, and Skinner, (2016)). Particularly in the shipping industry, one would expect that operational experience is reflected in more accurate earnings forecasts. Already a small increase in the age of the firm, one more year, will reduce the forecast error by almost 0.01%. In contrast, and against expectations, we find a positive relationship between size (*SIZE*) and the inaccuracy of earnings forecasts. A small increase of one percent in a firm's size will increase the average earnings forecast error by 0.57%.

A unique characteristic of the maritime industry is the role of large shareholders and/or founders. We expect to find that higher post-IPO ownership concentration (*CONC*) aligns with higher earn-

ings forecast accuracy and lower forecast errors. In fact, it appears that firms providing earnings forecasts at the time of an IPO have a longer operating history, and their founders maintain a higher ownership stake post-IPO. In addition to having a long track record and accepting under diversification of founders (by selling a lower proportion of their holdings), however, these firms seem to exploit information asymmetries in a volatile sector and issue less accurate earnings forecasts in their prospectuses. Against expectations, the marginal effect implies that a small increase of one percent in the dominant shareholder's ownership will increase the forecast error by 1.07%.

For the state of the stock market, the coefficient on the H/C dummy variable is negative and statistically significant. This result suggests that IPO firms listed during a "hot" stock market environment tend to announce more accurate earnings forecasts. When the market is in a "hot" state, the average forecast error falls by 2.79%. In contrast, firms listed during a "cold" stock market environment are characterized by low individual investor participation. These firms could make their earnings forecasts less accurate to attract higher institutional investor participation.

Looking at the results for the institutional factors, we find that IFRS adoption results in greater information accuracy. Firms with the greatest deviation of accounting practices from IFRS should thus have the most to gain from the transition (Brochet, Faurel, and McVay, (2011); Horton, Serafeim, and Serafeim, (2013)). When IFRS is adopted, the forecast error is 1.18% less.

6. Discussion of Findings

6.1 Why do shipping companies provide earnings forecasts?

An important issue is why the maritime industry is different from other industries, in that shipping companies exhibit a strong tendency to provide earnings forecasts at the time of their IPO. Although not required by law, more than half of all our U.S. sample IPOs issued earnings forecasts. Presumably, providing this information is an attempt to reduce information asymmetry and to mitigate any potentially negative impact of shipping companies' low credit ratings. Shipping bonds tend to be mostly

speculative or high-yield. On the one hand, the industry's cyclicality, capital intensity, and high financial leverage may jeopardize expected cash flows, especially during periods of recession. On the other hand, certain characteristics of the shipping industry reduce the sectoral credit risks, for example, low technology risk, low regulatory risk, and medium energy sensitivity. Overall, the industry's risks, combined with its competitive environment, reduce shipping companies' credit quality and increase their default probability.

For instance, Grammenos, Nomikos, and Papapostolou (2008) examine 50 shipping bonds issued during the 1992-2004 period. Most were assigned credit ratings of double-B, with a few firms obtaining single-B. They further analyze whether defaults could be predicted at the time of issuance, and if so, how. The following predictors for the probability of default are identified: relative issuing size, leverage ratio, working capital-to-total asset ratio, percentage of retained earnings, and shipping market conditions.

Taken together, financial decision makers in the maritime industry seem aware of the necessity of disclosing information and issuing earnings forecasts at the time of IPO to mitigate information asymmetry, lower the perceived riskiness of the firm, and reduce the cost of equity capital (Botosan, (1997); Lambert, Leuz, and Verrecchia, (2007)). More generally, the quality of management—its managerial objectives, strategic planning, and delivery, as well as its ability and stamina to deal with adverse shipping market conditions—is signaled through the disclosure of earnings forecasts. When effectively communicated to investors, these attributes may contribute to a narrower yield spread for a shipping bond issue and a lower cost of equity, along with sound investment, marketing, chartering policies, and prudent vessel sale and purchase decisions.

6.2 Why is financial leverage critical to the accuracy of earnings forecasts?

Another issue is related to the impact of financial leverage on earnings forecasts, and thus the reaction of strongly indebted companies to investors' demands for additional information. Fridson and Garman (1998) note that the maritime industry is one of the most highly leveraged sectors, due to the

large initial investment required for purchasing ships and operating them on a daily basis. Drobetz et al. (2010) show that, on average, shipping companies carry higher leverage ratios than comparable industrial firms. Grammenos, Nomikos, and Papapostolou (2008) find that financial leverage is a major determinant of shipping bond spreads and a predictor of the default probability of these bonds at the time of issuance. Taken together, the choice of leverage represents a key financing decision for shipping companies. Highly leveraged companies should attempt to limit the (expected) costs of financial distress, and issuing earnings forecasts at the time of IPO is one way to achieve that. Among the remaining shipping IPOs, however, there is evidence that higher leverage is negatively correlated with forecast earnings accuracy. High levels of debt increase the volatility of earnings, thus is becomes more difficult for managers to provide accurate forecasts.

Our results advise shipping firms to control their debt levels when deciding to go public. Investors may not participate in a public offering where proceeds will be used to repay bank debts. Moreover, excessive debt levels will lead to severe difficulties for ship owners and management to provide accurate earnings forecasts. If shipping firms realize they cannot issue precise earnings forecasts, they may decide not to disclose any information, which in turn could negatively impact their reputation.

6.3 Why do global market conditions affect the level of accuracy?

A third issue concerns the role global market conditions play in earnings forecast accuracy. For example, Grammenos, Nomikos, and Papapostolou (2008) argue that market conditions have an overly strong influence on the maritime industry. They note that, between 1995 and 2000, a period of generally weak market conditions, bulk carriers on average were scrapped at 25.2 years of age and tankers at 24.7 years. In 2006, however, a year of high earnings, the average scrapping age increased to 30 years for bulk carriers and 28 for tankers. Most recently, depressed market conditions have hit shipping markets and led to dramatic declines in freight rates and vessel prices. Several shipping companies defaulted on their high-yield bond issues.

We find that shipping IPOs listed during hot stock market periods are more likely to provide

earnings forecasts. With respect to forecasting accuracy, our results indicate that going public in a hot market environment is a signal of high earnings quality.

7. Additional Robustness Tests

7.1. Foreign versus domestic listings

The first robustness test controls for a foreign versus domestic stock market listing. In results not reported, we find that IPOs that go public in a domestic market experience reduced levels of underpricing, along with high absolute forecast errors. The results are economically significant, as shipping IPOs that opt to list in a foreign market are associated with an average 52% increase in initial returns, which translates into $13.19 million left on the table. With respect to accuracy, our results in Table 9 are affected by firm age, percentage of the highest shareholder, market conditions, exchange of incorporation, underwriter reputation, and institutional environment. In terms of listing in a foreign stock exchange, crucial factors for the accuracy of earnings are the size of the firm, the concentration of ownership, underwriter reputation, and incorporation in Greece where mainly many companies select to list abroad.

Finally, the recently adopted IFRS may have changed the level of earnings forecast errors for IPOs. If the new financial reporting standards negatively impact the level of forecast error, we would expect to find a negative coefficient on this interaction in our return regressions. We find that the coefficient on this variable is significantly different from zero, which reveals lower *AFE*s for IPOs that list in their domestic market. We thus conclude that the change in the financial reporting mechanism contributes to more accurate earnings forecasts. Regarding the listings in a foreign stock exchange, older and smaller companies tend to list abroad rather than in their home country, but especially smaller firms experience increased forecast errors. Among foreign listings, we report higher forecast inaccuracy for highly financial leveraged shipping companies, and for those incorporated in Greece.

7.2 Legal system effect

The second relevant question relates to the effect of the legal system on the quality of absolute

earnings forecasts. Arguably, the differences between common and civil law systems affect management's attitude when deciding whether to provide earnings forecasts. To address this issue, we create two subsamples and test for earnings forecast accuracy in Table 9. We find that lower underpriced shipping IPOs are associated with a higher probability of earnings forecast error in a civil law environment; higher underpriced IPOs fail to provide an accurate absolute forecast in a common law environment. The results further show that adopting IFRS in civil law countries improves the level of earnings forecast accuracy. However, in common law countries, it has the opposite effect. Finally, as expected, young, small, and highly leveraged shipping IPOs are associated with higher absolute forecast errors in a civil law environment, and high leverage, with low ownership concentration and high initial returns listed in a common law environment.

[*Please insert Table 9 here*]

8. Conclusion

This study analyses the accuracy of IPO earnings forecasts at an international level. Since country-specific studies cannot tell much about the impact of institutions and regulations, our main contribution to the literature is that we provide evidence of management earnings forecast accuracy by conducting a cross-country study. Our analyses are based on a sample of 189 global shipping IPOs over the 1989-2011 period. An interesting characteristic of our sample is that many U.S. shipping IPOs voluntarily issued IPO earnings forecasts, although the SEC does not require it.

Our results indicate that reported earnings tend to exceed forecasted earnings, which contradicts prior evidence that the management of IPO firms are typically overoptimistic in estimating future earnings. Presumably, this is because managers in the maritime industry lack sufficient experience in predicting the behaviour of their firms. Given the volatile environment shipping firms tend to operate in, they may also be cautious and reluctant to announce high earnings forecasts. Alternatively, they may anticipate that the market response to positive earnings surprises will increase share prices, leaving a good taste with investors. Therefore, they tend to deliberately report more conservative earnings forecasts in

order to support good long-term stock performance and be able to access the market again in the future if necessary.

We find that idiosyncratic, market-based, and institutional factors affect management earnings forecast accuracy. In particular, high ship owner participation after going public is associated with less accurate earnings forecasts. Our results further indicate that financial leverage, a listing in an emerging stock market, and global market conditions are other main factors responsible for inaccurate earnings forecasts. The adoption of IFRS in civil law countries improves the level of earnings forecast accuracy, while it tends to weaken it in common law countries.

In response to the questions raised in the introduction of this paper, we find that 1) firms in the shipping industry report biased IPO earnings forecasts, as they tend to be characterized by low levels of accuracy; 2) in most stock markets, issuers overstate information contained in economic variables; 3) while earnings forecasts are lower than actual earnings in the U.S., and the opposite holds for all other countries worldwide; and 4) paying underwriters for providing accurate earnings forecasts is value-enhancing. Overall, this paper elucidates the long-standing puzzle of earnings forecast accuracy in IPOs, which is an important corporate finance issue. Our results suggest that the SEC may take action against and penalize firms that decide to report earnings forecasts for intentional manipulation of the market and fail to achieve some minimum level of accuracy.

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Appendix A: Definition of variables

Variables	Predicted sign	Variable measurement	Included in...	
			stage 1	stage 2
Panel A: Dependent variable				
AFE / FE		Absolute forecast error (AFE) represents the magnitude of the error, while the average forecast error (FE) measures the bias in forecasts. The forecast error is calculated as the forecast for year *t*+1 earnings minus actual earnings for year *t*+1, scaled by the closing stock price at the beginning of year *t*.		x
Panel B: Control variables				
FLEV	+	Financial leverage, defined as debt-to-equity ratio.		
AGE	-	Number of years a firm has been in operation before the year of listing. It is measured as the natural logarithm of age.		x
LSIZE	-	Natural logarithm of the total market capitalization.	x	x
CONC	-	Percentage ownership of the largest shareholder post-IPO.	x	x
H/C	+	Market condition during the period of going public, which is detected on the basis of a double criterion: the number of IPOs performed during the respective quarter (intensity of IPO listing activity) and the quarterly returns for the Baltic Dry Index (BDI) and on the stock exchange of listing. The dummy variables takes a value of 1 (hot market) if there is a booming market period, and 0 otherwise (cold market).	x	
MAIR	+	Market-adjusted initial return, defined as the return to investors at the end of first day of trading minus the return of the market. Raw initial returns are adjusted for market changes, using the return on the respective national stock exchange between the offer price closing date and the end of first day of trading.	x	x
UND	-	Underwriter dummy variable, which takes a value of 1 if the underwriter is reputable (high quality), and 0 otherwise. Information is taken from Jay Ritter's website, which ranks 1,167 underwriters by quality.		
Incorporation in U.S.	-	Country of incorporation dummy variable, which takes a value of 1 if the company is registered in the United States, and 0 otherwise.		
Incorporation in Greece	-	Country of incorporation dummy variable, which takes a value of 1 if the company is registered in Greece, and 0 otherwise.		
IENV	+	Institutional environment of the listing country dummy variable, which takes a value of 1 if the IPO takes place in a common law country, and 0 if the IPO takes place in civil law country.	x	
EXC	-	Stock exchange dummy variable, which takes the value of 1 if the company is listed on stock exchanges in France, Japan, Germany, the US, or the UK, and 0 otherwise.	x	
IFRS	-	IFRS dummy variable, which takes the value of 1 if forecasts have been prepared in accordance with IFRS, and 0 if forecasts have been prepared in accordance with national GAAP of each country involved.		x

Table 1
Sample Description

Panel A: Number of observations in shipping industry by forecasted profits

Event year	IPO firms	Provide forecast	No forecast	Event year	IPO firms	Provide forecast	No forecast
Before 1989	9	5	4	2000	3	1	2
1989	2	2	0	2001	4	4	0
1990	2	2	0	2002	4	3	1
1991	3	2	1	2003	10	9	1
1992	7	6	1	2004	13	8	5
1993	3	1	2	2005	31	23	8
1994	6	3	3	2006	18	7	11
1995	7	2	5	2007	18	11	7
1996	7	6	1	2008	5	2	3
1997	15	7	8	2009	1	0	1
1998	10	3	7	2010	4	1	3
1999	5	3	2	2011	2	0	2
Total					189	111	78

Panel B: Characteristics of shipping IPO firms with earnings forecast

	Mean	Median	SD	Maximum	Skewness	Kurtosis
Total market capitalization of IPO (€ million)	475.92	266.01	747.08	5,067.43	4.47	23.73
Age of issuing firm in years (AGE)	34.55	14.00	43.69	182.00	1.58	1.86
Underwriter reputation (UND dummy)	0.56	-	0.49	-	0.21	-
IPO listed in hot or cold market period (H/C dummy)	0.64	-	0.48	-	-	-
Ownership (in %) of largest shareholder post-IPO (CONC)	35.97	34.49	28.98	80.02	0.54	-0.52
IPO listed on developed stock market (EXC dummy)	0.51	-	0.50	-	-	-
Market-adjusted initial return (MAIR)	2.86	-0.32	28.98	81.18	1.56	11.40

Panel C: Characteristics of shipping IPO firms without earnings forecast

	Mean	Median	SD	Maximum	Skewness	Kurtosis
Total market capitalization of IPO (€ million)	360.00	161.80	159.14	437.32	6.39	45.33
Age of issuing firm in years (AGE)	20.83	15.00	24.15	89.00	1.52	2.22
Underwriter reputation (UND dummy)	0.41	-	0.49	-	0.37	-
IPO listed in hot or cold market period (H/C dummy)	0.59	-	.0.51	-	-	-
Ownership (in %) of largest shareholder post-IPO (CONC)	28.29	22.16	29.70	77.03	1.08	0.15
IPO listed on developed stock market (EXC dummy)	0.41	-	0.49	-	-	-
Market-adjusted initial return (MAIR)	8.98	0.09	47.49	114.91	1.85	5.12

Panel D: Characteristics of U.S.-listed shipping IPO firms

	Mean	Median	SD	Maximum	Skewness	Kurtosis
Total market capitalization of IPO (€ million)	442.04	379.01	289.03	1,198.80	0.87	1.07
Age of issuing firm in years (AGE)	25.34	7.00	38.67	149.00	3.07	1.91
Underwriter reputation (UND dummy)	0.86	-	0.34	-	3.12	-
IPO listed in hot or cold market period (H/C dummy)	0.64	0.58	-	-	-	-
Ownership (in %) of largest shareholder post-IPO (CONC)	46.09	43.31	28.91	80.04	-0.87	0.34
Market adjusted initial return (MAIR)	2.37	-0.30	41.22	35.02	15.53	2.51

Panel E: Test for differences between IPOs with and without earnings forecasts

	Mean	Median		Mean	Median
Market capitalization (SIZE)	(3.03)***	(-2.52)***	Largest shareholder post-IPO (CONC)	(0.34)	(-0.96)
Age of issuing firm (AGE)	(-0.96)	(-1.71)***	Market-adjusted initial return (MAIR)	(0.51)	(-0.21)

This table presents details of our sample of global shipping IPOs. Panel A provides the number of listed shipping IPOs (full sample) in each calendar year. Panel B shows specific characteristics of shipping IPOs with management earnings forecasts. Panel C contains the same characteristics for shipping IPOs without management earnings forecasts, and panel D for all U.S.-listed shipping IPOs. Using selected company characteristics, panel E shows tests for differences (in means and medians) between the subsamples of shipping IPOs with and without management earnings forecasts. Panel F contains country-level descriptive statistics of global shipping IPOs.

Table 1 (Continue)

Panel F: Country-level descriptive statistics

Country	Market cap. (€ mill.)	Age of firm in years (UND)	Underwriter reputation (UND)	Market condition (H/C)	Largest ownership in % (CONC)	MAIR (in %)	Financial leverage (FLEV)	% Listing on foreign stock exchange
Belgium	237	115.00	0.33	0.33	40.10	8.06	2.15	0.00
Bermuda	222	3.50	0.62	0.50	54.40	19.31	1.07	1.00
Canada	327	39.00	0.50	0.75	66.00	7.62	1.96	1.00
China	971	20.80	0.25	0.75	40.60	-1.91	0.40	0.00
Denmark	214	93.00	0.40	0.60	16.00	11.80	0.25	0.20
Finland	129	46.50	0.50	0.50	27.00	-3.00	0.10	0.25
Germany	417	15.00	0.50	1.00	50.10	-15.00	0.69	0.00
Greece	420	14.20	0.68	0.75	39.60	5.00	0.89	0.87
Hong Kong	1,524	47.10	0.71	0.71	17.60	-9.40	0.83	0.14
India	125	25.36	0.00	0.42	26.50	19.80	0.55	0.16
Indonesia	83.5	12.41	0.00	0.0	47.30	48.30	0.40	0.00
Italy	440	55.33	0.66	0.66	24.20	-19.60	0.74	0.00
Japan	107	64.33	0.75	0.25	23.40	-7.20	0.62	0.00
Malaysia	252	12.14	0.70	0.42	13.50	55.10	0.71	0.00
Norway	257	46.42	0.05	0.50	27.80	7.30	1.73	0.00
Philippines	67.5	46.00	0.00	0.00	38.40	47.30	0.37	0.00
Russia	275	20.00	0.00	0.75	23.50	21.80	0.87	0.00
Singapore	125	19.71	0.13	0.38	30.50	-5.60	0.54	0.00
Sweden	58.5	5.80	0.00	0.60	23.60	-31.60	0.72	0.00
Switzerland	754	39.00	1.00	0.00	27.40	-49.70	1.14	1.00
Taiwan	1,305	22.33	0.00	0.00	11.70	-5.20	0.34	1.00
U.K.	121	8.00	0.40	0.90	16.80	33.80	0.10	0.40
U.S.	1,044	27.96	0.73	0.57	46.70	2.60	1.13	0.04
- NYSE	1,328	29.89	0.78	0.47	45.50	-0.80	1.27	-
- NASDAQ	293	31.60	0.61	0.80	60.10	12.10	0.82	-

Table 2
Correlation Matrix

This table presents pairwise correlations of the variables used as explanatory regression variables. The sample consists of global shipping IPOs that took place over the period January 1, 1990 to December 31, 2011. All variables are defined in Appendix A.

Panel A : Correlation matrix for shipping IPOs which provide earnings forecast

	AGE	SIZE	CONC	EXC	H/C	MAIR	UND	IENV
SIZE	-0.18							
CONC	-0.14	0.25						
EXC	-0.45	0.22	0.36					
H/C	-0.09	0.01	0.22	0.22				
MAIR	-0.07	-0.31	-0.06	-0.01	0.12			
UND	-0.23	0.39	0.34	0.60	0.25	-0.21		
IENV	-0.45	0.01	0.13	0.67	0.11	0.13	0.35	
FLEV	-0.09	0.01	0.11	0.11	0.10	-0.04	0.11	0.06

Panel B : Correlation matrix for full sample of shipping IPOs

	AGE	SIZE	CONC	EXC	H/C	MAIR	UND	IENV
SIZE	0.05							
CONC	-0.11	0.15						
EXC	-0.22	0.23	0.31					
H/C	-0.12	0.01	0.11	0.18				
MAIR	-0.01	-0.15	-0.01	-0.03	0.15			
UND	-0.06	0.37	0.30	0.56	0.08	-0.18		
IENV	-0.19	0.10	0.18	0.53	0.05	0.14	0.35	
FLEV	-0.01	0.13	0.29	0.16	0.06	-0.09	0.21	0.07

Panel C: Selection of instruments		
Initial set of instruments:		
	R^2	F-statistic
Absolute forecast error (AFE)	0.20	1.19
Ownership of largest shareholder post-IPO (CONC)	0.26	1.72
Instruments based on Lewbel (1997):		
	R^2	F-statistic
Absolute forecast error (AFE)	0.98	384.84
Ownership of largest shareholder post-IPO (CONC)	0.98	224.30

Table 3
Optimistic/pessimistic earnings forecasts of shipping IPOs

This table presents the classification of management earnings forecasts of shipping IPOs according to the level of forecast, i.e., optimistic or pessimistic forecasts, during the period January 1, 1990 to December 31, 2011. Panel A classifies the IPOs by country of domicile and stock market of listing. Panel B focuses on the most important shipping markets and reports the forecast error (FE), the absolute forecast error (AFE), and market adjusted initial return (MAIR) of the IPOs from issuers based in the major countries and listed on the major stock exchanges (SE).

Panel A: Optimistic/pessimistic earnings forecasts by country of domicile and stock market of listing

Country of domicile	Number of issues	Shipping IPOs with earnings forecast	IPOs with (+) earnings forecast	IPOs with (−) earnings forecast	Stock market of- listing	Number of issues	Number of issues with earnings forecast	IPOs with (+) earnings forecast	IPOs with (−) earnings forecast
Belgium	3	3	0	3	Brussels SE	3	2	1	2
Bermuda	7	1	0	1		-	-	-	-
China	8	1	0	1	Shanghai SE	3	-	-	-
Canada	4	4	3	1		-	-	-	-
Denmark	5	4	2	2	Copenhagen	4	4	2	2
Finland	4	1	1	0	Helsinki SE	-	-	-	
Germany	4	3	2	1	Frankfurt SE	3	3	2	1
Greece	31	19	15	4	Athens SE	6	-	-	-
Hong Kong	7	4	2	2	Hong Kong	10	5	2	3
India	12	5	3	2	Bombay SE	1	5	2	3
Italy	3	2	2	0	Milan SE	3	2	2	0
Japan	4	0	0	0	Tokyo SE	4	-	-	-
Malaysia	7	4	4	0	Kuala Lumpur	7	4	4	0
Norway	20	15	9	6	Oslo SE	2	1	9	6
Singapore	8	4	2	2	Singapore SE	9	5	2	3
Sweden	5	3	1	2	Stockholm SE	5	2	0	2
Taiwan	4	4	3	1	Taipei SE	4	3	3	
U.K.	5	2	1	1	London SE	6		4	1
U.S.A.	26	20	12	8	NYSE	43	29	17	1
Other	22	12	7	5	NASDAQ SE	25	20	13	7
					Other SE	18	7	6	1
TOTAL	189	111	69	42		189	111	69	42

Panel B: Underpricing and forecast error

Country of domicile	Total number of issues	FE	AFE	MAIR	Market of listing	Total number of issues	FE	AFE	MAIR
Greece	19	3.1	61	11.97%	Singapore SE	5	-9.9	14.45	10.05%
India	5	35.41	53.63	16.15%	Bombay SE	5	35.41	53.63	16.15%
Norway	15	12.71	49.05	6.63%	Oslo SE	12	0.05	50.44	6.38%
USA	20	-9.07	75.73	2.24%	NYSE	25	-14.5	64.18	-5.87%
					NASDAQ SE	20	16.85	69.96	9.81%
					London SE	5	27.46	30.27	10.12%

Table 4
Earnings forecasts of foreign and domestic listed shipping IPOs

This table presents details of management earnings forecasts of shipping IPOs. Panel A focuses on the geographical areas with most issuing shipping companies (country of domicile). Panel B shows the summary statistics of shipping IPOs with foreign listings. Panel C shows the summary statistics of shipping IPOs with local listings. Panel D shows tests for differences (in means and medians) between the subsamples of shipping IPOs with local and foreign listings. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Geographical areas with most listings of shipping firms

Country of domicile	Total number of issues	IPOs with foreign listing	IPOs with local listing	Number of issues with earnings forecast	IPOs with foreign listing	IPOs with local listing
Bermuda - Bahamas	12	12	-	2	2	-
China + Hong Kong+Taiwan	19	7	12	9	1	8
Denmark + Germany	9	1	8	7	-	7
Italy + Greece	34	26	6	21	19	2
India	12	2	10	5	-	5
Malaysia + Singapore	15	-	15	8	-	8
Scandinavia	29	4	25	19	4	15
U.K.	5	2	3	2	-	2
U.S. + Canada	30	1	29	24	1	23
Other	24	10	16	14	7	7
Total	189	65	124	111	34	77

Panel B: Shipping IPOs with foreign listing

	Mean	Median	Maximum
Age of issuing firm in years (AGE)	17.11	7.00	64.00
Ownership by the initial shareholders in % (CONC)	21.77	20.61	67.16
Financial leverage (FLEV)	1.09	1.17	3.74
Absolute forecast error in % (AFE)	64.02	58.83	166.00
Forecast error in % (FE)	-16.89	23.63	95.70
Market adjusted initial return (MAIR)	-2.92	-0.32	75.50

Panel C: Shipping IPOs with local listing

	Mean	Median	Maximum
Age of issuing firm in years (AGE)	46.89	38	38
Ownership by the initial shareholders in % (CONC)	25.12	14.04	63.82
Financial leverage (FLEV)	0.69	0.53	4.13
Absolute forecast error in % (AFE)	55.71	42.56	137.42
Forecast error in % (FE)	-4.30	7.92	103.23
Market adjusted initial return (MAIR)	4.26	-0.59	81.18

Panel D: Test for differences between local and foreign listed shipping firms

	Mean	Median		Mean	Median
Absolute forecast error (AFE)	(1.97)*	(-1.68)*	Largest shareholder post IPO (CONC)	(-0.91)	(0.97)
Age of issuing firm (AGE)	(-4.46)***	(-4.02)***	Market-adjusted initial return (MAIR)	(2.15)*	(1.98)*

Table 5

Distribution of initial public offerings sample by offer size, age, and ownership

This table presents forecast errors (FE) and absolute forecast errors (AFE) of management earnings forecast of U.S.-listed and non-U.S.-listed shipping IPOs (in %). Panel A provides categorizes IPOs by offer size, panel B by age, and panel C by ownership measured as the percentage of the largest shareholder post-IPO.

Panel A: Forecast error (FE) and absolute forecast error (AFE) by size						
Offer size	Sample Size	U.S.-listed		Sample size	Non-U.S.-listed	
(mill. €)		FE	AFE		FE	AFE
<100	10	-10.8	78.01	11	-29.8	39.63
100-200	7	5.9	25.41	11	18.89	71.04
200-300	8	4.6	18.18	10	-3.09	68.90
300-500	7	-34.2	70.70	10	60.96	70.42
500-1,000	7	34.3	56.47	10	-33.16	53.87
>1,000	7	-1.92	41.97	9	-55.51	60.43
Panel B: Forecast error (FE) and absolute forecast error (AFE) by age						
AGE	Sample size	U.S.-listed		Sample size	Non-U.S.-listed	
(years)		FE	AFE		FE	AFE
0-10	18	-16.33	59.60	7	24.03	56.43
11-20	9	-15.69	56.94	7	-31.16	73.69
21-30	6	23.15	37.83	15	-18.49	52.80
31-50	5	30.14	30.14	11	-1.24	39.56
>50	8	0.69	102.0	21	-25.26	49.84
Panel C: Forecast error (FE) and absolute forecast error (AFE) by ownership						
CONC	Sample size	U.S.-listed		Sample size	Non-U.S.-listed	
(in %)		FE	AFE		FE	AFE
5-15	9	17.26	92.45	20	6.4	48.38
15-30	10	42.21	90.86	14	-9.4	58.80
30-50	10	-19.75	55.12	13	-14.9	36.75
>50	17	26.80	52.16	14	-21.3	34.27

Table 6

Probit regression for the decision to provide a forecast (selection regression)

This table presents the results of the probit regression (first step) analysis for the choice between providing management earnings forecasts or not to announce this information (forecast/no forecast). See Appendix A for definitions of the variables. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. The standard errors reported in parentheses are adjusted for heteroscedasticity.

Dependent variable: Forecast/No forecast	Estimated coefficient	Marginal effect
Constant	2.834***	2.798
	(0.818)	
Firm age (*AGE*)	0.004***	0.004
	(0.001)	
Firm size (*SIZE*)	-0.180***	-0.177
	(0.05)	
Largest ownership post-IPO (*CONC*)	-0.003	-0.003
	(0.002)	
Stock exchange dummy (*EXC*)	0.907***	0.895
	(0.307)	
Market condition dummy (*H/C*)	0.352***	0.347
	(0.187)	
Market-adjusted initial return (*MAIR*)	-0.008**	-0.008
	(0.003)	
Underwriter reputation (*UND*)	0.434**	0.428
	(0.221)	
Financial leverage (*FLEV*)	0.035	0.034
	(0.108)	
Prob. (*J*-statistic)	0.130	
# observations	189	

Table 7
Main regression results controlling for endogeneity

This table presents the results from the second step GMM regressions, with the absolute forecast error (AFE) and largest ownership post-IPO (CONC) as the dependent variables (see equations 7a and 7b). See section 4.2 for details of the estimation methodology and Appendix A for definitions of all variables. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. t-statistics in parentheses are robust for heteroscedasticity using the White (1980) method.

	Estimation by GMM		Estimation by Lewbel's (1997) GMM	
	Dependent variable:		Dependent variable:	
	AFE	CONC	AFE	CONC
Constant	0.244	0.372	-0.385	0.332**
	(0.175)	(0.467)	(0.454)	(0.149)
FLEV	0.018	0.024	0.103***	-0.034**
	(0.018)	(0.041)	(0.040)	(0.018)
AGE	-0.008	-	-0.003***	-
	(0.006)	-	(0.002)	-
SIZE	0.023***	0.044	0.093***	-0.034**
	(0.010)	(0.036)	(0.037)	(0.015)
CONC	0.278***	-	0.952***	-
	(0.067)	-	(0.258)	-
H/C	0.010	0.121	-1.832***	0.951**
	(0.090)	(0.232)	(0.627)***	(0.288)
AFE	-	-1.558*	-	0.259**
	-	(1.068)	-	(0.121)
MAIR	-0.006*		0.002	0.001
	(0.003)	-0.012	(0.006)	(0.003)
		(0.010)	-	-
IFRS	0.035	-	-0.722**	-
	(0.045)	-	(0.314)	-
# observations	189	189	189	189
	Prob. (J-statistic): 0.118		Prob. (J-statistic): 0.234	

Table 8
Main regression result controlling both for selection bias and endogeneity

This table presents the results from the second step GMM regressions using Lewbel's (1997) methodology and including the inverse Mill' ratio to control for sample selection, with the absolute forecast error (AFE) and largest ownership post-IPO (CONC) as the dependent variables (see equations 7a and 7b). See section 4.2 for details of the estimation methodology and Appendix A for definitions of all variables. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. t-statistics in parenthesis are robust for heteroscedasticity using the White (1980) method.

Estimation by Lewbel's (1997) GMM			
	Dependent variable:		Marginal effects for AFE
	AFE	CONC	
Constant	-6.366*	0.335**	-10.488
	(3.666)	(0.148)	
FLEV	0.106**	-0.032**	0.157
	(0.048)	(0.018)	
AGE	-0.004**	-	-0.009
	(0.001)	-	
SIZE	0.311**	-0.035**	0.574
	(0.144)	(0.015)	
CONC	1.067***	-	1.067
	(0.307)	-	
H/C	-2.286***	0.990***	-2.792
	(0.856)	(0.294)	
AFE	-	0.214**	
	-	(0.123)	
MAIR	0.010	0.0004	0.021
	(0.007)	(0.002)	
IFRS	-1.185***	-	
	(0.436)	-	
Inverse Mill's ratio	7.308*	-	
	(4.394)	-	
# observations	189	189	
Prob. (J-statistic): 0.203			

Table 9
Robustness tests

This table presents the results from the second step GMM regressions, with the absolute forecast error (AFE) and largest ownership post-IPO (CONC) as the dependent variables (see equations 7a and 7b). Only the results for the AFE regression are reported. Estimation are for subsamples of shipping IPOs with domestic and foreign listings as well as listings in civil and common law countries. See section 4.2 for details of the estimation methodology and Appendix A for definitions of all variables. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. t-statistics in parenthesis are robust for heteroscedasticity using the White (1980) met

	Domestic listings		Foreign listings		Civil law		Common law	
	Dependent variable:							
	AFE	FE	AFE	FE	AFE	FE	AFE	FE
Constant	2.034	-6.140***	11.710***	-3.968	3.519***	-3.660***	0.6923	-1.459
	(0.885)	(2.046)	(2.699)	(2.398)	(1.129)	(1.633)	(1.0261)	(1.213)
FLEV	-0.084	0.1265	0.036**	0.096***	0.531***	-1.435***	0.1005***	-0.14***
	(0.063)	(0.113)	(0.021)	(0.009)	(0.117)	(0.310)	(0.014)	(0.042)
AGE	-0.200***	0.446***	0.134***	0.039	-0.160***	0.432***	-0.051	-0.106
	(0.045)	(0.140)	(0.061)	(0.046)	(0.039)	(0.142)	(0.033)	(0.070)
SIZE	-0.042	0.251***	-0.579***	0.137	-0.155***	0.179***	-0.023	0.122**
	(0.037)	(0.082)	(0.139)	(0.098)	(0.059)	(0.068)	(0.052)	(0.067)
CONC	-0.005***	-0.010***	-0.003	0.001***	0.005	-0.009	-0.006***	0.002
	(0.002)	(0.003)	(0.003)	(0.002)	(0.004)	(0.006)	(0.002)	(0.002)
EXC	-0.327**	-0.047	0.006	-2.890***	-0.966***	1.136***	0.022	0.922***
	(0.196)	(0.295)	(0.363)	(0.367)	(0.209)	(0.366)	(0.104)	(0.303)
H/C	0.235***	0.038	-0.103	2.076	0.174	-0.282	0.082	-0.085
	(0.109)	(0.186)	(0.495)	(1.430)	(0.149)	(0.250)	(0.149)	(0.194)
MAIR	-0.003***	-0.0003	-	-	-0.005***	- 0.004 ***	0.005***	-0.006***
	(0.001)	(0.002)	-	-	(0.002)	(0.002)	(0.001)	(0.001)
UND	0.434***	-0.256	0.521	1.22***	0.101	-0.003	0.214	0.267
	(0.166)	(0.256)	(0.427)	(0.409)	(0.155)	(0.208)	(0.159)	(0.182)
IFRS	-0.296***	-	-0.720***	-	-0.856***	-	0.560***	-
	(0.104)	-	(0.224)	-	(0.243)	-	(0.137)	-
Incorporation in U.S.	0.747***	0.630	-	-	-	-	0.625***	0.784**
	(0.1928)	(0.454)	-	-	-	-	(0.121)	(0.453)
Incorporation in Greece	0.086	3.218***	-0.089	0.621***	-	-	0.2601***	0.224
	(0.327)	(1.533)	(0.165)	(0.070)	-	-	(0.101)	(0.234)
IENV	-0.461***	0.636***	-	-	-	-	-	-
	(0.135)	(0.329)	-	-	-	-	-	-
Prob. (J-statistic)	0.77	0.67	0.57	0.76	0.516	0.475	0.675	0.720
# observations	72	72	35	35	40	40	67	67